

REMARKS

This timely filed Reply is responsive to the Final Office Action mailed on October 5, 2005 and is accompanied by a Declaration from Gary E. LeGrow, PhD, marked as Exhibit "A", as well as a Request for Continued Examination (RCE). In the Final Office Action all claims were rejected under 35 U.S.C. § 112, first paragraph, as well as based on cited art.

In this Reply, the specification has been amended to correct page and paragraph numbering irregularities. Because of such irregularities, references to the present application herein and in the accompanying Rule 132 Declaration will refer to Published Application No. 2005/0026769 which has no such irregularities. The specification has also be amended to clarify the Reidel synthesis is shown in Fig. 1(a), while the brief description of drawings now has the description for Figs. 1(a) and (b) separated to add clarity. Fig. 1(b) has been replaced by the overlapping but more comprehensive Figs. 4(a)-(e) filed with the provisional application (now all included in Fig. 1(b)) upon which the present application claims the benefit of. A paragraph describing Figure 1(b) based on page 13, lines 6-22, through page 14, lines 1-2 of the provisional application has also been inserted as new paragraphs [0016], page 6, lines 8-10, and [0017], page 6, lines 11-23 through page 7, lines 1-4.

Claims 1, 5, 6 and 10 been amended, and new claims 18-21 have been added. New claim 18 recites "a boiling point of said halosilane is less than 125°C". This is taught, for example, through disclosure of Me_3SiCl which has a boiling point of 58°C. New claim 19 recites "a stoichiometric excess of said disilazane is provided". A stoichiometric excess of HMDZ is taught in paragraph 31 of the published application. New claim 20 recites "wherein organic solvent is included in said reacting step. Support for this limitation can be found in the

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application where hexane addition is disclosed. New claim 21 includes the limitations of claims 18-20. No new matter has been added.

Before reviewing the claim rejections, Applicants will first review claim 1 as amended herein. Amended claim 1 recites:

1. A method of forming SiBCN-based preceramic polymers or oligomers, comprising the steps of:

reacting a disilazane having the general formula $(R_3Si)_2NH$, where R is selected from the group consisting of vinyl, hydrogen, phenyl, and alkyls containing 1 to 3 carbon atoms with a boron halide including at least two halogens and a halosilane including at least two halogens at a temperature of between 125 °C and 300 °C, wherein a SiBCN preceramic polymer or oligomer is formed, *wherein a chlorine content of said preceramic polymer or oligomer as formed in said reacting step is less than 100 parts per million.* (italics for emphasis).

An important aspect of the present invention is the formation of preceramic polymer or oligomers that have only trace amounts of Cl as synthesized. The invention solves a serious problem with the preparation of large amount of precursor material since the byproducts are often chlorine comprising salts (e.g. NH_4Cl) which have to be separated from the polymeric precursor by a filtration or distillation process. Such processes add expense, are time intensive and difficult to perform for generally insoluble preceramic polymers. The invention thus removes the need for generally costly additional processes, such as distillation or filtration, to remove Cl.

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Explicit support for the limitation "a chlorine content of said preceramic polymer or oligomer as formed in said reacting step is less than 100 parts per million" is found in paragraphs 9 and 47 as well as original claims 5 and 13. For example, paragraph 47 recites the following:

FIG. 8 shows the compositional changes of a SiBCN polymer according to the invention after pyrolysis. At room temperature, the chlorine content of preceramic polymer or oligomer is less than 500 ppm, such as less than about 100 ppm. Following processing at 200 degree. C., or above, no chlorine was detected. Therefore, the inventive method efficiently removes byproducts, especially ammonium chloride, as confirmed by the above results.

Although Applicants believe it is clear to one having ordinary skill in the art at the time of the invention that the less than 100 ppm relates to the as synthesized pre-ceramic polymer, Applicants have provided a Rule 132 Declaration from Gary LeGrow, Ph.D. to provide further evidence of the same.

Referring to the Declaration, Declarant LeGrow identifies several teachings in the '369 application to base his conclusion in paragraph 9 of the Declaration that "the '369 application clearly teaches one having ordinary skill in the art processes for synthesizing pre-ceramic polymers having a residual chlorine content of 100 ppm or less, as synthesized without the need for further processing to remove Cl." Paragraphs 4-8 identify several salient aspects of the '369 invention that enable synthesizing pre-ceramic polymers having a residual chlorine content of 100 ppm or less, as synthesized without the need for further processing to remove Cl. Some of these aspects are now recited in new claims 18-21. Accordingly, the limitation "*wherein a chlorine content of said preceramic polymer or oligomer as formed in said reacting step is less than 100 parts per million*" is clearly supported by the present specification.

In the Final Office Action claims 1-6 and 10 were rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. Specifically, the Examiner asserted that the specification does not support the provision of "said method being

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exclusive . . . in a halogen comprising environment" and considers this to be new subject matter. Based on the amendment to claim 1 described above, the rejections under 35 U.S.C. § 112, first paragraph are overcome.

Turning now to claim rejections based on prior art, claims 1, 2, 6, and 10 are rejected under 35 U.S.C. § 102(b) as being anticipated by Haluska (US 4,482,689). The Examiner states that:

Haluska teaches a method for preparing polyborosilazanes and ceramics prepared therefrom. See for instance the abstract. Particular attention is drawn to Example 1. This reacts hexamethyldisilazane (meeting claim 2), a halosilane (note that a disilane meets the halosilane in instant claim 1) and boron tribromide at a temperature of 200 °C and subsequently pyrolyzes at a temperature of 1200 °C. This meets the claimed method. Note that this reaction occurs in a non-oxidizing atmosphere meeting the newly added negative proviso

For claim 5, the Examiner notes that the polymer is strip distilled, which will eliminate any residual chlorine. This, combined with the absence of any mention of chlorine content, leads the skilled artisan to believe that chlorine is inherently absent from the polymer, meeting this requirement. See also column 9, line 41, which teaches that it is preferred that all NH_4Cl be removed prior to forming the ceramic.

For claim 6, see column 10, line 31.

Applicants agree with the Examiner's characterization of Haluska noted above. Significantly, as correctly noted above, Haluska teaches strip distillation to provide a low % chlorine preceramic polymer. In contrast, Applicant's claimed process recited in amended claim 1 provides "*a chlorine content of said preceramic polymer or oligomer as formed in said reacting step is less than 100 parts per million*". Other cited references, such as Bujalski form preceramic polymers having significant Cl concentrations. Accordingly, Since Applicants'

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claimed method recited in claim 1 and claims dependent thereon are is patentable over the cited art.

Applicants have made every effort to present claims which distinguish over the cited art, and it is believed that all claims are now in condition for allowance. However, Applicants request that the Examiner call the undersigned (direct line 561-671-3662) if anything further is required by the Examiner prior to issuance of a Notice of Allowance for all claims.

The Commissioner for Patents is authorized to charge the RCE filing fee, charge any deficiency in fees due, or credit an excess in fees with the filing of the papers submitted herein during prosecution of this application to Deposit Account No. 50-0951.

Respectfully submitted,

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